

- 2.—*Echinoidea, Brachiopoda, and Lamellibranchia from the Upper Cretaceous Limestone of Need's Camp, Buffalo River.*—By HENRY WOODS, M.A., University Lecturer in Palæozoology, Cambridge.

Plate I. and three figures in text.

AN account of the deposit from which the fossils here described were obtained is given at the end of this paper (page 425). The large specimens of *Perna* were found in the hard crystalline limestone; most of the other fossils came from the polyzoa-limestone. No species giving decisive evidence of the horizon of the limestone has been recognised, but the affinities of the forms described seem to show that the deposit belongs to a late stage of the Chalk.

## ECHINOIDEA.

### COPTOSOMA CAPENSE, sp. nov.

Plate I., figs. 15–17. Text-figure 1.

Test of medium size, with sub-circular outline, convex above, flattened below, somewhat concave around the peristome; height equal to less than half the diameter; greatest diameter in the lower third.

Apical disc rather small, not preserved.

Ambulacra not quite as wide as the interambulacra. Poriferous zones undulating. Pores unigeminal, except on the base of the test, where they are bigeminal. Plates high, consisting of six fused plates, with the six pairs of pores forming an arc. Each compound plate bears a large primary, imperforate tubercle (either very slightly or not at all crenulate), with a large areola, and a few small tubercles and granules around the margin. The primary tubercles are largest

at the ambitus, and smaller on the dorsal surface and on the base of the test.

Interambulacral plates high, each bearing a large primary, imperforate, slightly crenulate tubercle with an areola of moderate size; these tubercles are largest at the ambitus, where they are surrounded by a narrow band of small tubercles and granules. Above the ambitus, and on the base of the test, the primary tubercles become smaller; above the ambitus the surrounding band of granules becomes much wider. At the ambitus and continued on to the base of the test there is a row of secondary tubercles at the external margin of the area.

Peristome of moderate size.

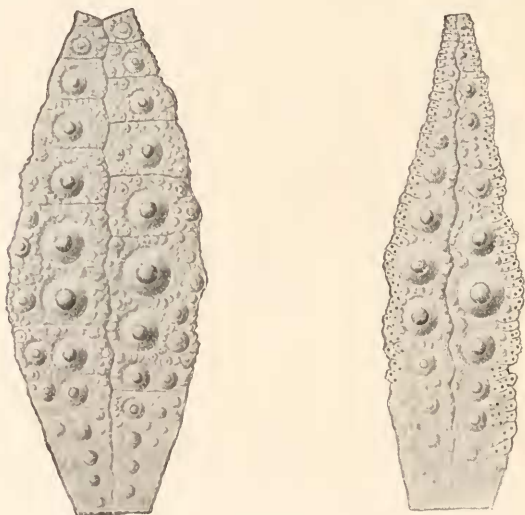


FIG. 1.—*Coptosoma capense*, sp. nov. Ambulacral and interambulacral areas.  $\times 2$ .

The bigeminal pores extending from the peristome almost to the margin of the base seem to distinguish this from other species of *Coptosoma*. The form of the test is similar to that of the type species, *C. cribrum*, Desor, but the granules, especially on the interambulacral areas, are much more extensively developed.

Portions of three tests have been found, the largest and most perfect of which is here figured. In all cases the apical disc is missing.

The only other remains of echinoids found in this deposit are some strongly ridged spines of *Cidaris*, and a portion of the test of an irregular form which may perhaps belong to *Cassidulus*.

## BRACHIOPODA.

## THECIDEA (LACAZELLA), sp.

## Text-figure 2.

The ventral valve is deep, more or less conical but sometimes rather irregular, and either slightly curved or nearly straight. The area is large and triangular, with a raised pseudo-deltidium. On the exterior of the shell are growth-ridges parallel to the margin of the valve. In the interior of the valve are narrow longitudinal ridges.

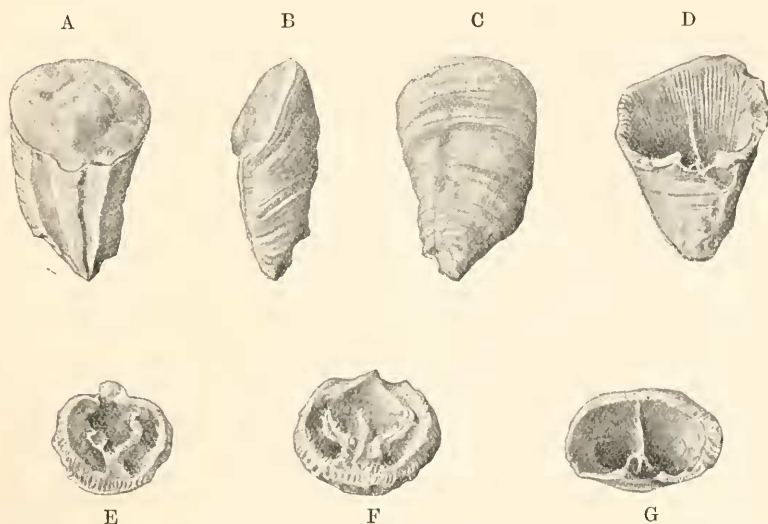


FIG. 2.—*Thecidea* (*Lacazella*), sp. A, B, C, three views of the same specimen; D, G, a ventral valve seen from the cardinal side (D) and from the dorsal surface (G); E, F, two dorsal valves. All  $\times 3$ .

The thin median septum is joined by a short branch on each side near the cardinal margin. This valve is deeper and less curved than in most examples of *Thecidea vermicularis* (Schlotheim),\* but is not so deep as in *T. longirostre*, Bosquet.†

\* For figures and references see Geinitz, Das Elbthalgeb. in Sachsen (Palæontographica, vol. xx., pt. 1, 1872), p. 162, pl. xxxv., figs. 35–38. Bosquet, Brach. Terr. Crét. Supér. de Limbourg (1859), p. 26, pl. iii., figs. 4–11. Posselt, Brach. danske Kridtformat. (Danmarks geol. Undersög., Nr. 6, 1894), p. 53, pl. iii., figs. 23–25.

† Bosquet, *op. cit.*, p. 33, pl. iv., figs. 4–6

The dorsal valve is oval, slightly convex, with the umbo near the margin. The internal margin is ornamented with ridges. From the median septum one or sometimes more branches come off on each side.

Several examples of this species were found by Mr. Lang when searching for Polyzoa in the broken-up rock.

## LAMELLIBRANCHIA.

### OSTREA, sp.

A small specimen of part of a left valve is probably an example of *O. vesicularis*, Lamarek.\* That species occurs in the Ariyalūr Group of Southern India, and is widely distributed in deposits of Senonian age.

Some other examples of *Ostrea*, but not sufficiently perfect for specific determination, have been found.



FIG. 3.—*Ostrea (Exogyra)*, sp. Right valve. Natural size.



FIG. 4.—*Perna*, sp. Left valve. Internal cast of part near the umbo and of part of the ligamental area. Natural size.

### OSTREA (EXOGYRA), sp.

#### Text-figure 3.

There are two right valves which resemble *O. (Exogyra) Langloisi*, Coquand, from the Senonian (Santonian) of Algeria and Tunis.†

\* Coquand, Monogr. du Genre *Ostrea* (1869), p. 35, pl. xiii., figs. 2-10. Stoliczka, Cret. Fauna S. India, vol. iii. (1871), p. 465, pl. xlii., figs. 2-4, pl. xliii., fig. 1, pl. xlv., figs. 7-12. Peron, Brachiopodes, etc., de la Tunisie (1893), p. 175. Wanner, Palæontographica, vol. xxx., pt. 2 (1902), p. 119, pl. xvii., figs. 10-12.

† Peron, *op. cit.*, p. 146, pl. xxiv., figs. 14, 19.

## PECTEN (NEITHEA), sp.

An imperfect specimen which appears to be part of a left valve of *Neitheia* is present in the collection.

## PERNA, sp.

Text-figures 4-6.

There are twelve internal casts of a large sub-quadrate *Perna*. In some cases portions of the shell are preserved and show a prismatic structure similar to that seen in *P. Ricordeana*, d'Orb.

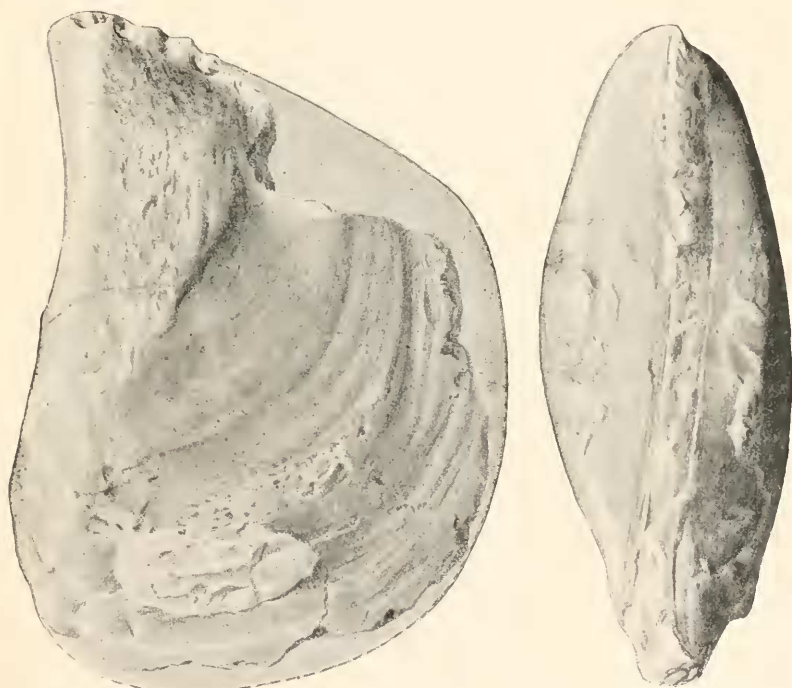


FIG. 5.—*Perna*, sp. Internal cast. Left valve and anterior view of both valves. The posterior and the ventral margins are imperfect.  $\times \frac{4}{5}$ .

The largest specimen has a height of about 150 mm., and its hinge-line is about 85 mm. long. One example shows the cast of the ligament area and grooves. This species resembles *P. valida* (Stoliczka)\* from the Ariyalūr Group (Senonian) of Southern India,

\* Cret. Fauna S. India, vol. iii. (1871), p. 409, pl. xxii., fig. 1.

and also *P. cereviciana*, Pethö,\* from the Senonian of Čerevič (Hungary). But more perfect specimens are needed before an exact determination can be made. The ligament grooves are less numerous and more widely separated than in *P. cereviciana*, but



FIG. 6.—*Perna*, sp. Internal cast. A considerable portion of the posterior part of the shell appears to be missing.  $\times \frac{1}{5}$ .

the flattened part of the shell extending ventrally from the umbo is similar in both species.

\* Die Kreide- (Hypersenon-) Fauna d. Peterwardein. Gebirges (Paläontographica, lii., 1906), p. 234, pl. xvii.

## NOTE ON THE LOCALITY.

These fossils were obtained by Mr. J. W. Woods, of East London, from Need's Camp, on the Buffalo River, twenty miles from the sea and at an altitude of about 1,200\* feet. Mr. Woods says the limestone is "exposed in two open workings about two miles apart, and the one about fifty feet higher than the other. In the lower the greatest thickness is six feet and seems to be composed entirely of the remains of small shells, echinids, cup-corals, and various spines. . . . In the upper quarry the limestone is mainly crystalline and hard, and seems to be a mass of shell of mussel type: a few 'shark's' teeth have been found in it. We had a section there of eight feet to examine, and how much more exists cannot be stated as the workings have not gone deeper.

"The areas where the deposits occur are completely enclosed by dolerite: they may be described as two level ten-acre lots surrounded by boulders; and were, I presume, old shore-basins or lagoons, walled in by the igneous dyke, where the molluscs lived and died, or into which they were gradually swept by the tide."

The interest of this fauna is very great because it occurs at a place more than half-way between the Pondoland Upper Cretaceous outcrops and the main area of the marine Lower Cretaceous in Uitenhage. No fossils from similarly situated beds have been described, though limestones like that from the top quarry at Need's Camp are known from the neighbourhood of Sand Flats at about 1,200 feet above sea-level.

A. W. ROGERS.

\* This is the figure given by Mr. Woods; it is probably too great by 100 feet, as in Gamble's list of heights the Need's Camp beacon is said, on the authority of Capt. W. Bailey, R.E., to be 1,144 feet above sea-level.



## EXPLANATION OF PLATE I.

POLYZOA AND ECHINOIDEA FROM THE UPPER CRETACEOUS OF NEED'S CAMP,  
BUFFALO RIVER, CAPE COLONY.

1. *Filisparsa ramosa*, d'Orbigny.  $\times 12$ . Obverse face of part of a zoarium, showing tendency of apertures to be arranged in V-shaped rows (p. 408).
2. *Filisparsa fragilis*, Marsson.  $\times 12$ . Obverse face of part of a zoarium (p. 408).
3. *Diastopora compressa* (Goldfuss).  $\times 12$ . A young zoarium, showing the first-formed zoecia to be slightly emergent, while the more distal are immersed (p. 409).
4. *Idmonea virgula*, d'Orbigny.  $\times 12$ . Obverse face of zoarium (p. 410).
5. *Crisina cenomana*, d'Orbigny.  $\times 12$ . Obverse face of a specimen resembling d'Orbigny's figure of *Idmonea calypso*, showing strongly-marked zoecial boundaries (p. 411).
6. *Crisina ecarata* (d'Orbigny).  $\times 12$ . Obverse face of part of a zoarium. In the proximal part the lateral series of apertures of each side are practically opposite, and so appear to form continuous bands across the zoarium. Distally is a front view of the right-hand series only, and those of the left-hand are seen in profile (p. 412).
7. *Crisina marginata* (d'Orbigny).  $\times 12$ . Obverse face of part of a zoarium viewed rather from the right side, so that only the edges of the left-hand series of apertures appear; the alternate arrangement of the series of apertures is therefore not obvious in the figure (p. 412).
8. *Tervia dorsata* (von Hagenow).  $\times 12$ . Obverse face of part of a zoarium (p. 413).
9. *Tervia gibbera*, Gregory.  $\times 12$ . Obverse face of part of a zoarium viewed from the left-hand side. The end of a "dorsal process" appears at the top left-hand side of the figure, springing distally from the reverse face (p. 413).
10. *Entalophora virgula* (von Hagenow).  $\times 12$ . Part of a zoarium (p. 414).
11. *Entalophora conjugata* (von Reuss).  $\times 12$ . Part of a zoarium. Some of the apertures appear to be arranged in whorls or spirals; but these are only rows of three, and the series do not continue on the half of the branch not shown (p. 415).
12. *Entalophora echinata* (Römer).  $\times 12$ . Part of a worn zoarium (p. 415).
13. *Spiropora verticillata* (Goldfuss).  $\times 12$ . Part of a zoarium (p. 417).
14. *Entalophora madraporacea* (Goldfuss).  $\times 12$ . Part of a worn zoarium (p. 416).
- 15-17. *Coptosoma capense*, sp. nov. Natural size. (p. 419).